AUDECIBEL

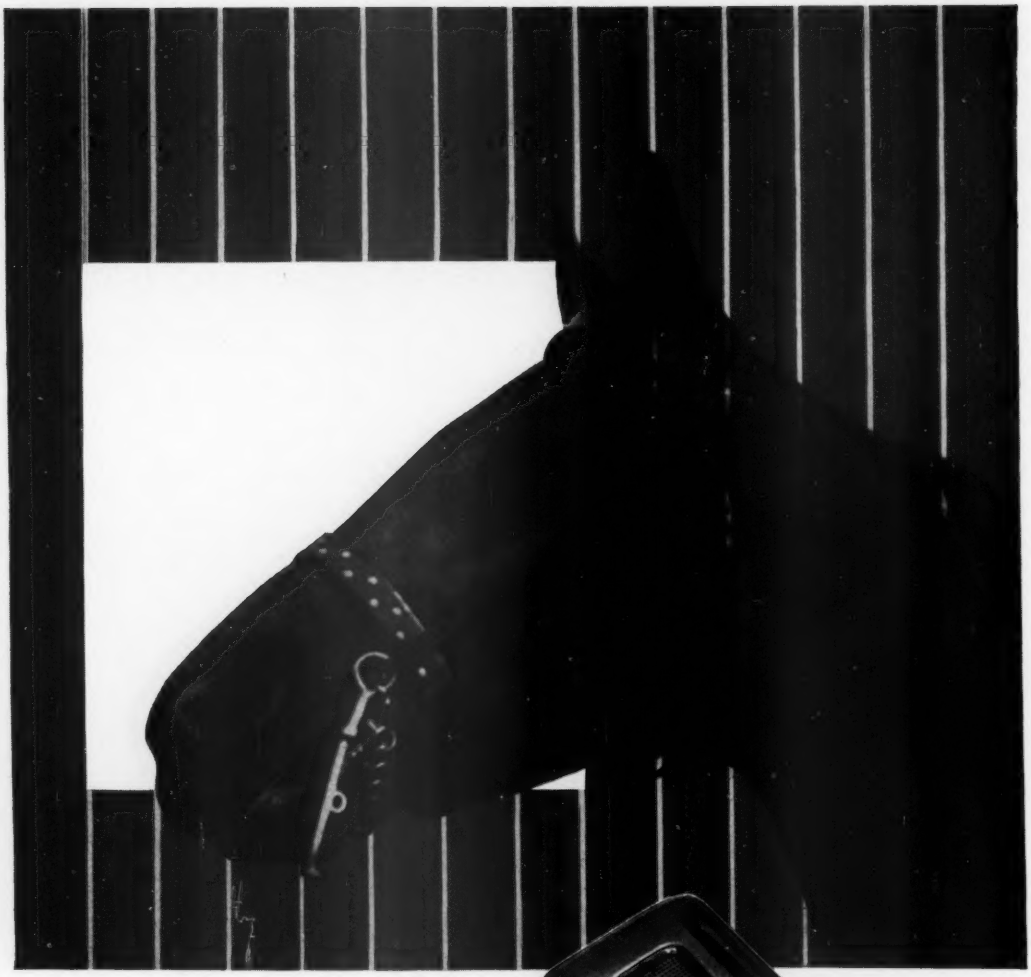
September / October 1954
Vol. III No. 5

In this issue:

RECRUITMENT
by William F. Waldrop

INCIDENCE OF HEARING LOSS AT 90 db LEVEL
by Donald E. Mowrer

JOURNAL OF THE SOCIETY OF HEARING AID AUDIOLOGISTS



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The Purpose. ***Audecibel*** is strictly an educational and professional journal, the purpose of which is to bring to the otologist, the hearing aid audiologist and others interested in the field of hearing and audiology, authoritative articles, papers and data concerned with research, techniques, education and new developments in the field of treating and assisting the hard of hearing.

The Goal. The ***Society of Hearing Aid Audiologists*** is dedicated to the goal of reaching and maintaining the highest possible ethical standards in the field of hearing aid audiology. • ***Audecibel*** is dedicated to the goal of rapport among all those concerned with the hard of hearing so that mutual and overlapping problems may be recognized, and outstanding ideas, skills and experiences be shared for the greater benefit of all. You are urged to write in for details of how YOU may participate in and benefit by this worthwhile endeavor.

AUDECIBEL

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S.H.A.A. Certified Membership List ..... 14 e.s.

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Distinguished Jury Honors S. H. A. A.

In the 1954 Awards Contest for Distinguished Service conducted by the American Trade Association Executives in Washington, D.C., the Jury on Awards composed of Hon. Sinclair Weeks, Secretary of Commerce of the United States, Richard L. Bowditch, President, Chamber of Commerce of the United States; Harold C. McClellan, President, Nat'l Association of Manufacturers; Neil H. Borden, President, American Marketing Association, Professor of Marketing, Graduate School of Business Administration, Harvard University; Dr. George W. Robbins, Acting Dean, School of Business Administration, University of California, decided to present a Certificate of Recognition to the Society of Hearing Aid Audiologists in honor of the quality of the entry submitted by the Society.

In the Next Issue . . .

"Hearing Aid Design for Selective Fitting"

by Harvey Fletcher, Ph.D.,

Director of Research, Brigham Young University

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How's Your B. P.?

(Business Personality!)

Every business has one—good ones usually succeed—poor ones fail!

a message from
Grover C. Coil
Executive Director
Society of Hearing Aid Audiologists

WHAT kind of a personality does your business express? Is it a lackadaisical, soiled, disorderly, dull thing or is it bright and clean and sparkling with enthusiasm? Does its orderliness inspire confidence in its integrity, competence and responsibility?

The personality you as an individual express is not necessarily the same as that expressed by your business. The latter is sometimes an altogether different thing and while it is true that the line of authority in a business runs from top to bottom, it does not necessarily reflect without distortion the personality of the top executive.

The fabric of a business personality is the warp and the woof of everyday transactions. Contacts in person, by telephone and by mail all go to weave the pattern, be it attractive or not.

What IS B. P.?

It might be interesting to you to find out what your business personality is like. You will find it to be the sum total of what you and your staff say and do and how you and they say it and do it.

Not merely the words uttered, but the expressions on the faces of those speaking reflect the thoughts that are in their minds, which too frequently belie the words that they utter.

Too often the remark is made about places of business to the effect that while the owner is wonderful, they do not like the treatment they receive when they enter the store and therefore they have ceased doing business there.

Some of these reasons are that promises stated or implied prior to or at the time of the purchase are not lived up to in the post sale period. Others are the result of sloppy business methods such as small errors in prices, in change, shipments improperly addressed, goods improperly charged, etc., the nervous approach evidence of displeasure at the amount of time the customer is taking to make a decision, the employee who seems to be hypnotized by his own grandeur and approaches all customers in a manner of condescension.

In some offices the staff has created a dummy monstrosity called a crank. This crank is any one who comes into that place of business and fails to "click" with the members or a member of the staff. Usually this is a result of an unsolved problem that the customer has. It may be one of instrumentation or procedure.

Don't Be Blinded

A hard of hearing person who is not hearing properly with an instrument can at times appear to be very unreasonable. The writer has never seen one of these where the unreasonablness failed to disappear after the complaint had been adjusted, it sometimes occurs that the personnel in one particular place of business become so blinded that it is impossible for them to locate the cause of the complaint which, of course, it is necessary to do before the complaint can be adjusted.

The solution of a user's problem sometimes requires thorough reanalysis and a complete reappraisal of all of the factors that enter into the original fitting—physical-medical, electrical, educational and psychological including the complete instrument, power supply and ear mold. A complete otological review may be in order.

There is no question but what some of these cases can be difficult and trying, particularly if they come into your office on a day when you are otherwise particularly busy.

However, through misunderstanding, carelessness or ignorance or just plain laziness, staff members occasionally find it simplier to classify the individual as a crank and let it go at that.

Within the area of persons who can be served by amplification, all can be serviced properly by competent, educated and trained personnel willing to take the time to do it.

The impact of the business personality of your place of business is felt by every individual who enters it. Would you entrust such an important thing as your hearing, to say nothing of investing an amount perhaps as much as $300 in a dirty, disorderly office? In such a place, would you not have a right to expect that the nature of their business transactions would be just as sloppy and unclean as their office appeared to be?

How long has it been since the walls of your place of business have been washed or painted? How long since your carpets and draperies were cleaned—the furniture washed or cleaned? Does the furniture feel sticky and greasy when you run your hand over it?

However attractive or unattractive your office or store may be, it is the frame in which your business personality exists.

It Did Happen Here...

Mr. Charles Murphy, Mathieson Chemical Co., in an address before the Maryland Industrial Marketers made a statement that "roughly 40% of the sales of the big 7 companies in the chemical field are accounted for by products that were not made 15 years ago."

This is considered to be outstanding and somewhat sensational, but it doesn't compare to the situation in the hearing aid industry where more than 85% of the sales of the 7 top companies are accounted for by transistor type hearing aids which did not exist as little as 5 years ago.

This is an indication of how rapidly things happen in the hearing aid industry, and where you are thinking about merchandising methods or where you are thinking about products, it isn't safe to say that it cannot happen in the hearing aid industry.

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Send papers to Grover C. Coil, Managing Editor, Audecibel, 6 North Michigan Avenue, Chicago 2, Illinois. All manuscripts submitted must be signed by the author. Photographs, charts or diagrams accompanying such manuscripts become the property of Audecibel.

Pulse-Type Amplifiers Introduced by G.E.

By making electrical current "beat" like your heart, only faster, General Electric engineers have found a way to amplify signals so feeble that, by use of a termocouple, temperature can be regulated with a sensitivity of less than a hundredth of one degree.

The new principle of using pulse current to amplify small signals was discovered in the company's General Engineering Laboratory.

Experimental development work has shown that a pulse-type magnetic amplifier can control equipment from a signal level of 10^{-61} watts over an ambient temperature range of —70° to 140°C. This compares with 10^{-8} watts attainable with conventional magnetic amplifiers.

G.E. is now developing pulse-type amplifiers for use in conjunction with conventional magnetic amplifiers wherever extreme sensitivity is desired.

Subminiature Transformers

A completely new 32-model line of subminiature transformers especially designed for transistor and other miniaturized circuit application is being introduced by Texas Instruments Incorporated, a leading transistor and electromechanical equipment manufacturer. This transformer line is among the most complete yet announced in the subminiature size range.

The smallest of the four series is particularly designed for transistorized *hearing aid use.* The 16 cast models in the four series are equipped with flat surfaces to further facilitate product miniaturization by glueing into position where desired.

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Beltone Meets Deep in the Heart Of . . .

The ears of Texas were present at the recent all-day meeting conducted in Fort Worth by the R. J. Higgins Company, distributor for the Beltone Hearing Aid Company. At the head of the table for the banquet which followed the sessions are (left to right): Charles Knox, office manager; R. H. Higgins, board chairman; Ben Wofford; vice president, David H. Barnow, Beltone's executive vice president, and guest speaker of the evening; Mrs. Higgins, secretary-treasurer, and Chris Durbin, president of the Higgins organization.

A TRUE MEASURE OF PROFIT

Profit is never measured in dollars and cents alone. The profits of a business include many things. The prestige gained by winning the respect and admiration of all the people of the community, for example. Or, the satisfaction earned by serving your fellow man. Security, too, is important. Many things make up the true measure of profit.

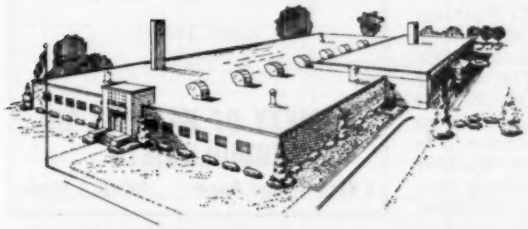
Telex distributors have discovered they make profits of all kinds through selling fine quality hearing aids manufactured by a company that, since 1937, has set the standard for the industry. Telex dealers make more money, more profits of every kind because Telex instruments are better engineered, better constructed, to give absolute customer satisfaction.

Telex hearing aids have an amazing record for dependability. The Telex distributor adds to his profits because each instrument he sells is a quality product manufactured by a firm that stands at the top in every phase of its operation from the manufacture of hearing aids to the manufacture of industrial electronic devices.

A typical example of the high quality Telex builds into each and every instrument is the Telex 957 All-Transistor—the smallest practical hearing aid Telex has ever manufactured. This hearing aid has the finer features of larger, more expensive instruments yet offers invisible hearing to women, inconspicuous hearing to men. Telex dealers make more sales because Telex manufactures the kind of hearing aids the hard-of-hearing want.

Yes, Telex hearing aid dealers everywhere know a Telex dealership offers more profits of every kind—in dollars and cents, in prestige, in service to the people of their community. You may be looking for a franchise that offers real opportunity. And we may be looking for you. If you're interested in one of the Telex distributorships now available, write *Sales Manager, Hearing Aid Division, Telex, Inc., Telex Park, St. Paul, Minnesota.* You'll find Telex offers a true measure of profit—more profits in more ways.

write, wire or call today...



TELEX, INC. Telex Park St. Paul, Minnesota

World's Finest Precision Hearing Aids

Advice of Counsel

by Felix Visk

I was disappointed when I read the new Revenue Act to find that Congress had not repealed the income tax. Guess they heard of my old Aunt's saying that "Death and taxes are always with us." Still I kinda hoped they might slip and repeal the whole darn thing and then I wouldn't have to write about it.

The advance dope was that the Act would give us some tax relief and would make returns more simple to fill out. As I read the Act, the relief granted the average man is small. The new forms will not be available till about January but it is my bet they will be as bad as ever.

Perhaps the first change of importance is the due date. Your 1954 return will not be due till April 15, 1955 if you are on an annual basis, which most of us are. If you file your return on a fiscal year basis (as many businesses do) your return will be due the 15th day of the fourth month following the end of the fiscal year. For example, if your business year ended June 30th and you file on that basis, your report would be due October 15th.

April 15th is also the day that individuals must file their first estimate of taxes to be due for 1955.

A New Wrinkle

As has been the case, everyone who had gross income of $600 a year or more must file a return; however, a new wrinkle has been added. If you became 65 during 1954 you need not file a return unless you have gross income of $1,200 or more.

The marital status benefits have been enlarged. As is generally known, a husband and wife living together may file a joint return and each claim half the income and thus take advantage of lower tax brackets. Now a widow or widower who has a child or stepchild living with him or her as a dependent may continue to file under the joint return rates for the next two years after the death of the marital partner provided the survivor does not remarry during that time. If the widow or widower remarries, then his or her status will be determined by the circumstances of the new marriage. Some further consideration is also given to "head of household" taxpayers.

The requirements as to individuals filing declarations of estimated income have been liberalized. After 1954 you need not file if your gross income will not exceed $5,000 if you are single, $10,000 if married and filing a joint return or a "head of household" and includes income not subject to withholding of $100.00 or more or in all cases you expect to have income not subject to withholding plus your wages subject to withholding in excess of $600 multiplied by the number of your exemptions plus $400. In community property states this varies since each spouse is entitled to one-half the income. Here you add $800. (Who said Congress made this business simpler?)

Some Get a Break

Persons having income from dividends from domestic corporations get a break. First—the first $50 of such income is not taxes at all. Here again the community property states are a bit different because if the dividends are community property the exclusion for a married couple is $100. Second—the taxpayer gets a credit against his tax of 4% of the amount of dividends received. That is, you compute your tax and then deduct 4% of your total dividends before writing your check to Uncle Sam. This only applies to dividends received after July 31, 1954. This year this credit is limited to 2% of your taxable income. Next year to 4%.

There are provided more liberalized deductions for outside salesmen, and transportation expense necessary to the job. More liberalized rules for dependents' credits, principally in the case of children who are students and for medical deductions. The rules for long and short term capital gains and losses have also been changed somewhat.

More about all these later. In the meantime, see your attorney now for ways of saving taxes and before filing your return. This column is only designed to point out some things you should look for and not to take the place of your own tax consultant.

Joint Meeting

A meeting will be held in Washington, D.C., October 20 through 22, in the auditorium of the Dept. of Health, Education and Welfare. The meeting is under joint sponsorship of the American Hearing Aid Association and the Office of Rehabilitation. The title of the meeting is A Working Conference to explore and study community aspects of hearing problems.

Are You a Delinquent?
Be sure that your name is included in AUDECIBEL's monthly listing of Certified Hearing Aid Audiologist Individuals and Firms

Consent Judgment Dampens Enthusiasm

Consent judgment entered in Federal District Court at San Francisco in the antitrust action against the Golden Gate chapter of the National Electronic Distributors Assn. is serving to dampen enthusiasm, industry observers believe, for the recently revived idea of some executives and members of the jobber group to combat price competition with a buying co-operative.

The judgment, filed June 28, 1954, and reported as a bulletin in the July issue of JOBBER NEWS, prohibits collusive action which is illegal, as well as individual and independent action which in itself is not illegal but which would have the effectiveness of a boycott if pursued. Individual defendants retain the right to negotiate exclusive distributorships with manufacturers who have such a national policy.

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SOCIETY OF HEARING AID AUDIOLOGISTS
6 North Michigan Avenue Chicago 2, Illinois

Recruitment

by *William F. Waldrop*

Director, St. Luke's Speech and Hearing Service, Chicago; Director of Audiology, Children's Memorial Hospital, Chicago.

THE phenomenon of recruitment was first reported by Dr. Fowler of New York in 1928. Let us consider this phenomenon for a few minutes. With the normal ear, speech at 45 decibels is comfortably loud, while speech at 70 decibels or greater becomes annoying. However, in the ear where recruitment is present loudness increases more rapidly above the impaired threshold. For example, speech 10 to 15 d.b. above the threshold may be comfortable, but speech at 25-30 d.b. may cause considerable discomfort. Thus, recruitment may be defined as an "abnormally rapid increase in loudness as the intensity of a sound is raised above the threshold."

Fowler's Binaural Loudness Test

Dr. Fowler determined the presence of recruitment by his "Binaural Loudness Balance Test." This test can only be used if one ear is normal at one or more frequencies. In order to give this test, in addition to have one good ear, you must have either two audiometers or one of the newer clinical model audiometers which has two circuits in it so that you can present the clear tone alternately to the two ears.

Now suppose we present a tone of 20 decibels in the right ear. We will say his right ear is fairly normal and in the left ear we know that there is a definite hearing loss. Then we present the same tone in the other ear, bringing up the loudness of it until he says they sound the same.

This procedure is continued by increasing the loudness in steps of 5-10 d.b. while holding the intensity in the normal ear constant and present the pure tone alternately in the good ear and the impaired ear, at the same time varying the intensity in the impaired ear until the subject reports the tone equally loud in the two ears. The responses are recorded on an audiogram blank and the corresponding intensities of the two ears are connected with the familiar ladder like lines indicating lack or presence of recruitment by the direction the lines assume as in Figure 1.

This test depends entirely on having a person with one good ear and one bad one, but generally we don't see these people. They are the kind that are seen by doctors in making the diagnosis.

What we are interested in is a method of measuring recruitment without having to have one good ear in the situation.

Several other tests for recruitment have been developed in Europe. These can be used on subjects having both ears impaired. The two most interesting are the Bekesy and Luscher tests.

The Bekesy Test

In the Bekesy test, the subject takes his own audiogram with an audiometer in which both the frequency and intensity dials are driven by electrical motors. The frequency is gradually increased automatically from

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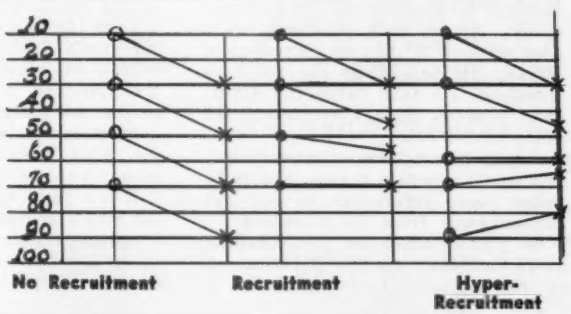


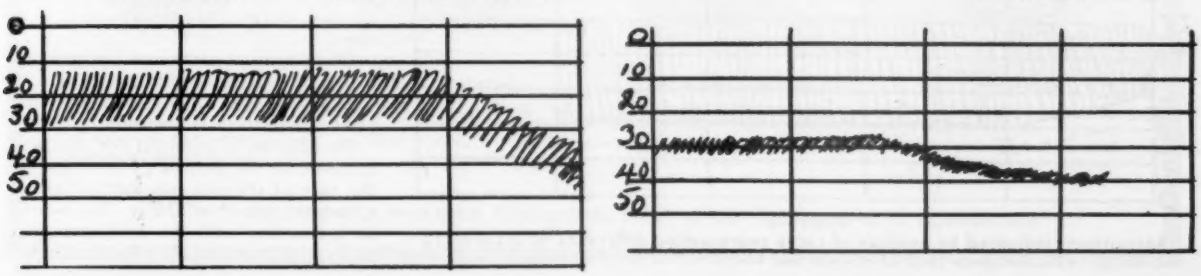
Figure 1

Typical responses illustrating lack of recruitment, recruitment and hyper or severe recruitment.

Figure 2A
No Recruitment

Curves of normal ear and one with recruitment as drawn by the Bekesy Audiometer.

Figure 2B
Recruitment



Recruitment

by William F. Waldrop

(Concluded from Page 7)

the low through the medium and high frequencies. At the same time, the intensity starting below threshold increases automatically until audible. When the subject is aware of the tone, he presses a button which causes the tone to decrease until it is no longer heard. He continues this procedure reversing the intensity from below and above his threshold while a curve is drawn automatically by the pen of the instrument giving an audiogram as a jagged line. The width of this jagged line determines the absence or presence of recruitment since the ear with recruitment, and its greater sensitivity to intensity changes, will reverse the instrument more quickly than the normal ear.

The Luscher D.L. Test

The Luscher test is based on the fact that an ear with recruitment will hear smaller changes in intensity than the normal ear as in the preceding test. However, a warble tone in which the intensity changes can be varied from 0 to 3 decibles is used. As the warble is introduced it is increased gradually from 0 to 3 d.b. in extent. The subject is asked to indicate when he first hears the warble or beat. The normal ear hears warble of approximately 1.5 to 2 d.b. while the ear with recruitment hears warbles of between 0.5 and 1 d.b. The smallest recognizable interval between two intensities is called the Difference Limen by psychologists.

Northwestern University D.L. Difference Test

Jerger at Northwestern University has improved upon this test by measuring the Difference Limen as in Luscher Test at the two intensities of 10 and 40 d.b. above the subject's threshold. He then takes the difference between them (subtracting DL 40 from DL 10).

Due to the nature of recruitment, you would expect a greater ability to judge those differences as you get further away from the threshold.

So you subtract the DL obtained at 40 decibels from the DL obtained at 10 decibels. This difference is then plotted on a chart similar to an audiogram as in figure 3.

If the curve lies below the shaded area, recruitment is present.

Research indicates that recruitment is present in:

1. Acoustic trauma
2. Meniere's Disease
3. Congenital Heredity Nerve Deafness
4. Secondary Nerve Degeneration of otosclerosis and Otitis Media

But it is not present in:

1. Acoustic tumors
2. Presbyacusis
3. Psychogenic loss
4. Pure Conductive loss

In general, the recruitment tests enable the otologist to determine the location of the lesion in perception losses as either in the cochlea or the 8th nerve.

How does all of this affect us in the selection of a hearing aid and the rehabilitation of the subject with recruitment? The knowledge of its existence may save us time in selecting and adjusting aids of these wearers.

We do not have to be told that recruitment is present in the subject who tries to jerk the receiver out of his ear the minute the volume is turned higher than his comfort level.

But, what do we do for these wearers? Various means have been tried. The majority of these tend to level out the peaks in the response curve, by the use of dampened receivers, insertion of small resistances, compression amplification, or use of the hidden ear mold. A compromise between comfort and the best speech intelligibility which the wearer will accept must be reached but we must not go too far in either direction. I personally feel that the use of the hidden ear mold is going too far in the direction of compromise. This further handicaps ears with high frequency losses by its attenuation of the high frequencies resulting in poorer word recognition.

A few years ago I had available an aid which provided for the insertion of several resistors of varying attenuation. I found several wearers with recruitment who would accept this aid above all others. The same was true with the introduction of aids with compression amplification, which is one of the good things to come from the Harvard report. Generally speaking, the two latter methods seem best.

Since the advent of transistor aids we have had to rely mostly on the dampened receiver, particularly the plastic inserts with graduated openings. Recently resistors of varying attenuation have been announced and we can expect compression or its equivalent later.

With any of the above procedures a progressive program attempting to raise the wearers tolerance can be initiated by gradually reducing the attenuation over a period of time.

Several stubborn cases of recruitment have been referred to our clinic by both otologists and dealers. A few of these were wearing the hidden mold and were encouraged to discard it for one of the above fittings, and have benefited by the increased word recognition. Others have had their tolerance increased by auditory training during which they were convinced of the necessity of increasing the volume over that which they had been using.

In conclusion, I wish to state that the wearer with severe recruitment is a problem which requires the cooperation of an otologist, a hearing clinic and the hearing aid dealer to solve.

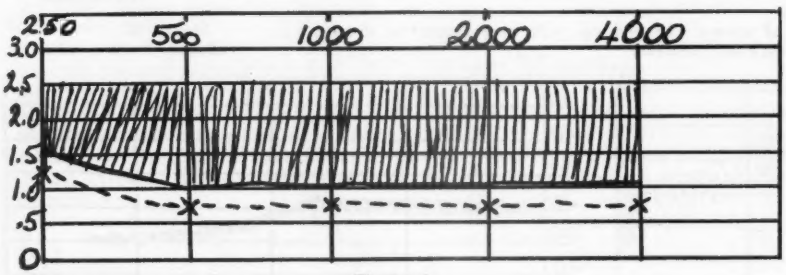


Figure 3
Recruitment indicated by position of curve representing difference of D.L.s at 10 and 40 db. (Shaded area that of normal ear.)

Inexpensive Goodwill

Reprints of the authoritative, interesting and helpful articles that appear in each issue of AUDECIBEL are available at very moderate cost . . . and are being widely used by alert merchandisers as a dignified method of keeping in contact with clients. Let us have your inquiries.

Fears Effect of Socialized Medicine

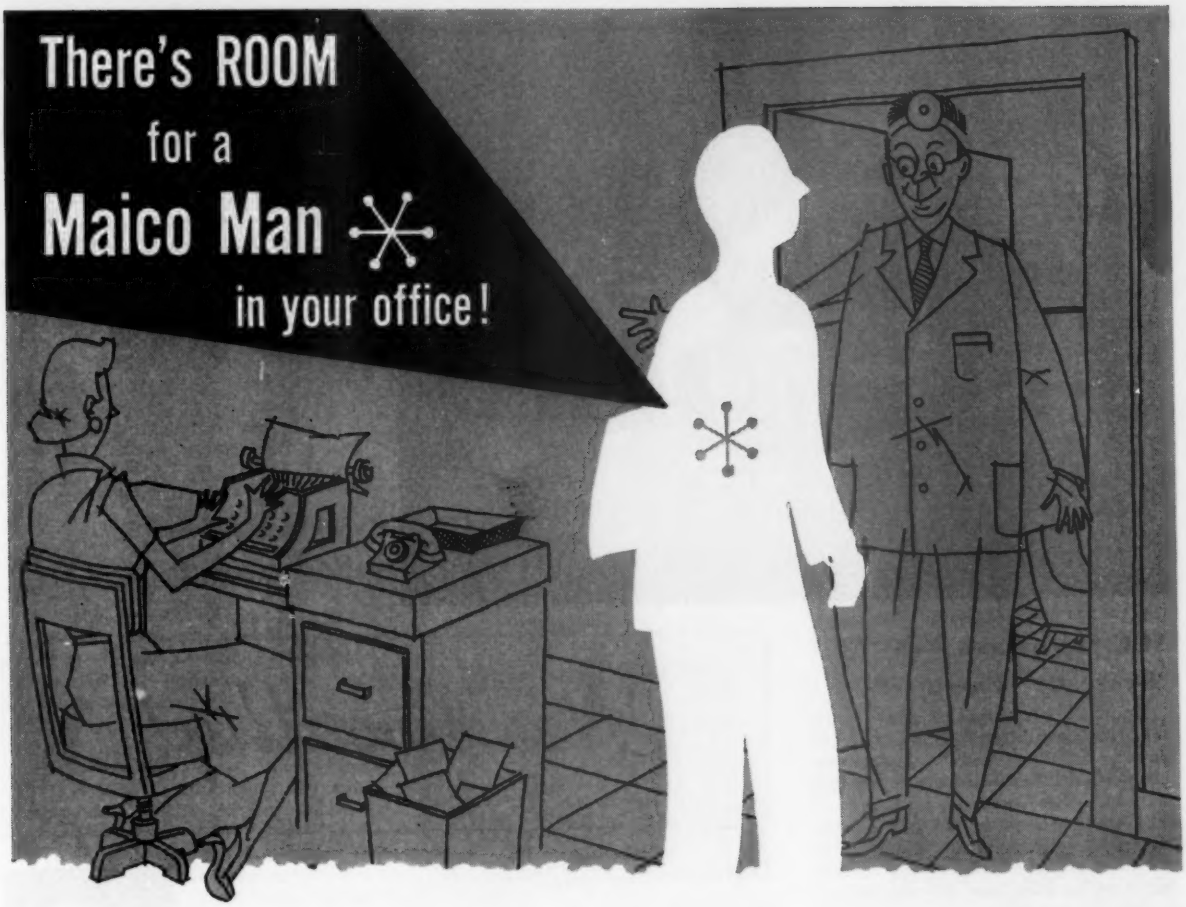
Cardinal Stritch said Thursday, Sept. 16th, socialization of hospitals and medicine would place the public under dangerous political authority.

"Nothing would so defeat real efficiency as we know it as socialization," he said in the Palmer House in Chicago.

The Cardinal addressed 300 persons at an annual Sisters' luncheon held in connection with the American Hospital Association convention.

He said he is thankful for the new interest on the part of government in the care of the sick but wants this interest expressed in a way that would be in keeping with the American traditions of freedom.

There's ROOM for a Maico Man in your office!



Maico Audiometers, group testing and group training units are widely accepted by the Medical Profession.

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90% OF ALL AMERICA'S PRECISION AUDIOMETERS BUILT TODAY ARE MAICO-BUILT AUDIOMETERS

NCC Introduces New "Eveready" Energizers

Fourteen new types of power units for transistor hearing aids, to be known as "Eveready" Energizers, have recently been announced by National Carbon Company, a Division of Union Carbide and Carbon Corporation. These Energizers will also serve as the "A" power supply for certain types of vacuum-tube hearing aids.

"Eveready" Energizers are designed to fit all hearing aids using mercury-type batteries. Those among the new Energizers for which consumer demand is expected to be heaviest are the E340E (1.5 volts) and the E1E, E3E, E4E, and E12E (all 1.3 volts). With the addition of the 14 new Energizers, National Carbon now offers the only complete line, with an "Eveready" brand battery or Energizer for every hearing aid that exists. There is, of course, a continuing demand for "Eveready" "A" batteries and "Mini-Max" "B" batteries for vacuum-tube instruments.

Anyone interested in obtaining complete technical information on the new "Eveready" Energizers should write National Carbon's Battery Engineering Department, 30 East 42nd Street, New York 17, N.Y., asking for BATTERY ENGINEERING BULLETIN NO. 7. This bulletin is available free of charge.

"Don't know where you got my name, but I sure appreciate getting AUDECIBEL. This has been badly needed for years!"

F.C., M.D.

. . . and we appreciate receiving such letters!

Newsworthy!

Outstanding Address by Katharine Barrett

At the Greater Chicago Hearing Aid Retailers Association meeting Tuesday, September 21, at the Western Society of Engineers' Club, Miss Katherine Barrett, Director of the Bureau for Physically Handicapped Children of the Board of Education was guest speaker.

Miss Barrett gave a vivid, educational explanation of the work of the Bureau and the problems of the teachers of the deaf and otherwise handicapped child. She said children as young as three years of age are admitted to the school for training. The teachers, of which there is a serious shortage, must have special training over and above the requirements for teaching normal children. She also brought out that the training of the handicapped child is laborious and slow, as compared to teaching the normal child, the child who is deaf from birth being particularly difficult to train as he can not talk because he cannot hear and does not develop speech as hearing children do who are otherwise handicapped.

Transporting these children from their homes to the school by bus is a very costly procedure, as explained by Miss Barrett, the entire expense being borne by the Board of Education.

An interesting comment by Miss Barrett was the fact that there have been three generations of hard of hearing children in several families, that have attended the schools.

Visitors at this meeting included Mr. Thornton Zanolli of Detroit, Mr. Kenneth Wood of Grand Rapids, Mrs. Mary Sweeney and Miss Franklin of the Chicago Hearing Society.

Herbert E. Moros

Mr. Herbert E. Moros is the new Southeast District Governor elected by the Society's membership during the 1954 Annual Meeting.

In 1948, Mr. Moros established the Moros Audiphone Company in Jacksonville, Florida, an undertaking for which he prepared himself by spending extensive time in the New York plant and offices of Western Electric, and by consultation with such established figures in the Hearing Aid field as Mr. George Absolom, also of Florida. Mr. Moros has been an SHAA member since early in 1952.

Blomberg Heads Beltone's New Audiometer Division

Boyd Blomberg, appointed manager of the audiometer division of the Beltone Hearing Aid Company, Chicago, will supervise manufacture and sales of hearing test instruments. Blomberg has 14 years supervisory experience in the manufacture and sales of audiometers and is a member of the American Society of Safety Engineers.

Beltone also announced that Mrs. Terry King has joined the Audiometer Division in Chicago. Mrs. King, who is a member of SHAA, was formerly chief Audometrist at Montreal (Canada) General Hospital and has just moved to Chicago to take up her new duties.

Mrs. Terry King

Boyd Blomberg

Radical Design Improvements in New Beltone Audiometer

A radically new design in audiometers for accurately testing hearing loss was announced Monday, September 20, by the Beltone Hearing Aid Company, Chicago.

The new audiometer [shown here] is for use in schools, industrial plants, clinics, medical offices, and other places where hearing tests are conducted, said David H. Barnow, executive vice pres.

Weighing less than 11 pounds, its circuit contains 75 percent fewer component parts than most other audiometers. "This assures more reliable performance and easier maintenance," Barnow stated.

The Beltone audiometer has only one tube and one voltage regulator. It is carried in a self-enclosing case. A sliding panel protects the face of the instrument when not in use. Other instruments have from 3 to 11 tubes.

The instrument was designed by Ralph E. Allison, Whittier, Calif., a prominent audiometric engineer and a member of the American Standards Association committee setting objective specifications for hearing instruments.

"Allison based his design on many interviews with leading hearing specialists. His experimental models were tested and approved by experts throughout the country," Barnow added.

Because of its drastically simplified circuit, the new instrument maintains a stable calibration which assures more accurate test measurements.

The Beltone audiometer can be used for individual testing as well as for groups up to 40 persons.

Other improvements brought by the Beltone audiometer are:

1. For group testing it enables reading the hearing loss directly on the dial.

2. A new type attenuator eliminates distracting clicking sounds when the hearing loss dial is turned.

3. The masking tone is calibrated,

enabling a more accurate measurement for individual tests. (Masking tone is a noise deliberately produced to enter the untested ear while the other ear is being tested.)

4. The instrument has one bone conduction and two air conduction receivers for individual testing.

The Beltone audiometer, Barnow said, is designed to meet rigid American Medical Association standards.

High-Flying Toothaches

At 30,000 feet, travelling some 300 mph, the least of an aviator's problems should be his teeth.

Yet, Dr. Floyd A. Peyton, professor of dentistry at the University of Michigan's School of Dentistry, indicates that the toothache in the sky is one of the serious problems dentists will have to face in the future.

A flyer may take off feeling great as far as his teeth are concerned. But, as he sails into the clouds the change in atmospheric pressure may produce an extremely painful toothache.

Also, a perfectly fitting set of dentures on the ground has been known to drop in the aviator's lap at high altitudes.

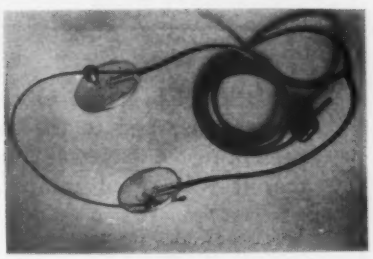
This has led to a new word for the layman: "aerodontalgia," or, a toothache at high altitudes.

New Hi-Fi Studio Mike Announced by Shure Bros.

Shure Brothers, Inc., 225 W. Huron Street, Chicago 10, Ill., Manufacturers of Microphones and Acoustic Devices, announce their new Model "333" High Fidelity Studio Microphone. The Concert-Line "333" is a uni-directional microphone which has (1) extended frequency responses: 3-15,000 c.p.s., plus or minus 2½ db; (2) the world-famous, patented "Uniphase" system; (3) small size, slim design, matchless beauty. The "333" has been designed for TV Studios, Motion Picture Studios, Radio Stations and Professional Recording Studios. It also is recommended for professionals and hi-fi enthusiasts who demand the highest quality for their recordings in the home.

Complete technical data and illustration of this studio microphone may be found in Shure Catalog 33, available at Shure Distributors or upon request to the Sales Division of the manufacturer.

Telex Introduces New Over-Head Style Headset



Design and production of a 1.6 ounce over-the-head style headset with a variety of applications from stenography to aviation has been announced by Telex, Inc., national manufacturers of precision hearing aids and electronic components in St. Paul, Minn.

Resembling a pair of ultra-thin earmuffs, the unit consists of a sensitive plug-in mechanism, thin stainless steel band that slips over the head and two clear plexiglas air cushions. The cushions slide on the band, adjusting to the correct length, and a ball and swivel joint at the base of the cushions permits comfortable adjustment to the ear. Sound—transmitted from the receiver in the plug—is piped into the cushions through sturdy, light hollow plastic tubing.

Impedance of the standard unit is 128 and 2,000 ohms. Special impedances can be provided on request. The unit is recommended by the manufacturer for use in aviation, transcription, radio monitoring, ham radio operation and various television applications.

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of those interested in effectively reaching the entire field of Audiology—Medical, Research, Clinical, Education, and Hearing Aid Retailers.

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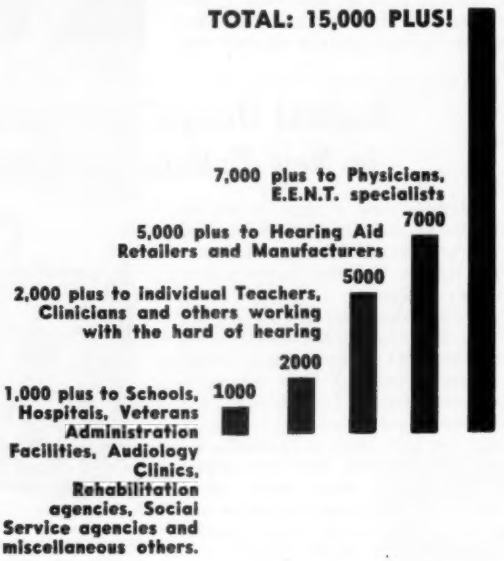
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7,000 plus to Physicians, E.E.N.T. specialists
7000
5,000 plus to Hearing Aid Retailers and Manufacturers
5000
2,000 plus to individual Teachers, Clinicians and others working with the hard of hearing
2000
1,000 plus to Schools, Hospitals, Veterans Administration Facilities, Audiology Clinics, Rehabilitation agencies, Social Service agencies and miscellaneous others.
1000

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Official Publication of the Society of Hearing Aid Audiologists

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Incidence of Hearing Loss at 90 db Level

by *Donald E. Mowrer*

Speech & Hearing Therapist
Chippewa Local Schools
Doylestown, Ohio

Within the past few years otologists, as well as other professional workers in the field of acoustics, have been aware of the deleterious effects of noise upon the human organ of hearing. Although much research has been and is being conducted to discover the various effects of noise upon man and his environment,[2] little is known concerning the hearing acuity of men and women who are working near noisy machinery in industries throughout the nation.

It is the purpose of this study to investigate the incidence of hearing loss found among employees who work near noisy machinery.

Procedure

Industry Selection. Five small industries in north central Ohio were selected for this study. The industries consisted of three body shops (in which truck bodies are manufactured), one machine shop (in which tools are manufactured), and one milk processing plant.

Noise Survey. Noise survey was conducted in each plant to determine the decibel output of the machines in the plant as well as to determine the noise level during audiometric testing.

Instrumentation. The instrument used for audiometric testing was a 1954 model Maico portable F-1 audiometer. A Sound-Survey Meter, type 1555-A, was used to conduct the noise survey.

Subjects. Two hundred and twenty employees served as subjects. Their age ranged from 19 to 65.

Testing Procedure. Each employee who worked in the plant was given a discrete frequency audiometric threshold hearing test if he failed to respond to more than three tone signals of 20 decibels or below during a 20 decibel sweep check. The frequencies which were tested were 500, 1000, 2000, 3000, 4000, 6000, and 8000 cycles per second. The employees were tested individually in a room as far removed from external noise as possible. Each employee was removed from the noise conditions in which he had been working for a period of at least five minutes prior to testing.

Results and Discussion

The United States Public Health Service, Washington, D.C., states that it has been estimated that one-third of all adults have some hearing loss in one or both ears.* As shown in Table 1, the number of employees found to have a hearing loss far exceeds the expected amount, with the exception of the office personnel. It was found that of the employees who worked around noisy machinery, 72.5 per cent of the entire group of 200 employees had a hearing loss.[1] Of the office personnel, only 20.0 percent had a hearing loss. (This latter group was not subjected to the noisy machinery.)

It was not only found that the incidence of hearing loss far exceeded normal expectations but the type of hearing losses were amazingly similar. The majority of hearing losses can be described in the following manner: a sharp decrease in hearing acuity at 3000 c.p.s., further decrease at 4000 c.p.s., a slight recovery at 6000 c.p.s., and sometimes almost complete recovery at 8000 c.p.s.

Table 2 shows the general results of the sound survey (in decibels) including a reading of the noise level from the loudest machine, a reading from the quietest machine, the average decibel reading throughout the plant, and a reading of the test conditions.

It is interesting to note that in comparing the per cent of employees who have a hearing loss in each plant with the average over-all decibel reading in each plant, it would seem that the greater the over-all decibel reading, the greater the incidence of hearing loss. Another point which is of interest is the fact that the office personnel, who were not submitted to the high noise intensities did not show the high incidence of hearing loss as was found in employees who worked near the noisy machinery. These data suggest that the incidence of hearing loss may be a function of the decibel noise level.

Naturally, there are many other factors to consider such as age of the subject, previous ear trouble, individual noise susceptibility, frequency characteristics of the noise, and so on, but it is felt by this writer that the intensity of the noise may be a very important factor in determining the incidence of hearing loss. The severity and type of hearing loss is still

(Concluded on Page 20)

*A hearing loss is here defined as a loss greater than 20 decibels in three frequencies in one or both ears.

TABLE 1. **Incidence of normal hearing and hearing losses of employees.**

Industry	No. with Normal Hearing	No. with Hearing Loss	% with Normal Hearing	% with Hearing Loss	Total Tested
No. 1	5	14	26.3	73.7	19
No. 2	14	42	25.0	75.0	56
No. 3	16	49	24.6	75.4	65
No. 4	18	21	44.7	55.3	39
No. 5	2	19	9.5	90.5	21
Office Personnel	16	4	80.0	20.0	20
				Total	220

Individuals and Firms Certified by SHAA National Board to Fit, Service and Sell Hearing Aids

As of September 15, 1954

The following list of certified individuals and firms will appear in all issues of AUDECIBEL, as a result of numerous inquiries for this service. You are urged to check your listing for accuracy and to send in changes or corrections without delay. Names of those delinquent for 1954 fees will be dropped from future issues.

INDIVIDUALS

A

Aber, Karl H., 207 E. Front St., Tyler, Texas
Abrams, Morris, 543 "E" St., San Bernardino, Calif.
Absalom, George M., Jr., 1211 Security Bldg., Miami, Fla.
Adams, Leonard, 161-10 Jamaica Ave., Jamaica, New York
Adams, L. E., 92 S. 9th St., Minneapolis, Minn.
Ahearn, F. Davis, 1405 "K" St. N.W., Washington, D.C.
Alger, W. Ross, 13 Yorkville Ave., Toronto, Ontario
Allan, Minnie E., 224 6th St., Albuquerque, N. Mex.
Ambler, Leonard O., 435 York St., Vallejo, Calif.
Anderson, Frank E., 142 High Street, Portland, Me.
Anderson, Mae R., 500 Fifth Avenue, New York, New York
Ashlock, Charles W., 1511 Franklin St., Oakland, Calif.
Attix, Edward H., 402 Bank of America Bldg., San Jose, Calif.

B

Baird, Willard W., 1228 Grant Ave., Cuyahoga Falls, Ohio
Baldwin, Carl J., 1403 Independence Bldg., Charlotte, N.C.
Bannon, Robert A., P.O. Box 138, Glens Falls, N.Y.
Banta, Fred W., 9 Ransom St., Grand Rapids, Mich.
Barnes, Faye M., 212 Park Bldg., Council Bluffs, Iowa
Bartley, Robert A., 3010 Jenkins Arcade, Pittsburgh, Pa.
Baxter, Robert C., 215 W. 1st, Duluth, Minn.
Beckman, Clarence W., 317 Stevens, Ortonville, Minn.
Begley, John H., 209 E. Laurel St., Arcadia, Calif.
Bennett, Barbara, 481 Main St., New Rochelle, N.Y.
Bennett, Henry G., 481 Main Street, New Rochelle, N.Y.
Bennington, F. E., 1737 Chestnut St., Philadelphia, Pa.
Berman, William, 48 E. 43rd St., New York, N.Y.
Berry, Edward A., 203 W. Holly, Bellingham, Wash.
Bertelsen, Howard G., 26 O'Farrell St., San Francisco, Calif.
Billeter, Rolland C., 504 Post Bldg., Battle Creek, Mich.
Blackhall, Alice M., 247 King St., West, Chatham, Canada
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Blake, Wm. A., 507 3rd St., Santa Rosa, Calif.
Blauvelt, Barker S., Box 644, Honesdale, Pa.
Blauvelt, Eleanor, 184 Broadway, Newburgh, N.Y.
Blauvelt, Livingston, 184 Broadway, Newburgh, N.Y.
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Brenaman, Hette E., 510 Broderick Twr. Bldg., Detroit, Mich.
Brenaman, Ronald H., 510 Broderick Twr. Bldg., Detroit, Mich.
Brooks, Horace E., 709 Heartwell Bldg., Long Beach, Calif.
Brooks, Ruby A., 709 Heartwell Bldg., Long Beach, Calif.
Brown, Charles O., 133 Neal Avenue, Newark, Ohio
Browning, Stanley I., Mayo Arcade, Ashland, Ky.
Brynolfson, Horace W., 797 Flatbush, Brooklyn, N.Y.
Burger, Richard T., 4021 E. Florence Ave., Bell, Calif.
Burke, Henry H., 311 Seaboard Bldg., Seattle, Wash.
Burke, Mildred A., 311 Seaboard Bldg., Seattle, Wash.
Burrill, Giles M., 1112 Hume Mansur Bldg., Indianapolis, Ind.
Burt, Floyd C., 413 10th St., Richmond, Calif.
Burton, J. Byron, 302 Kress Bldg., Long Beach, Calif.
Burton, John L., 302 Kress Bldg., Long Beach, Calif.
Bush, Orpha, 936 Edison Bldg., Toledo, Ohio
Bush, Thomas G., 936 Edison Bldg., Toledo, Ohio
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Byers, Alice J., 1109 Empire Bldg., Pittsburgh, Pa.

C

Calandra, Victor M., 1040 N. Throop, Chicago, Ill.
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Carver, Kathryn M., 116 New York Bldg., St. Paul, Minn.
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Chew, Mabel G., 582 Bankers Trust Bldg., Indianapolis, Ind.
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Clark, Richard L., Jr., 655 Rose Bldg., Cleveland, Ohio
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Cluse, Rita V., 20 W. Federal St., Youngstown, Ohio
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Craig, Edna S., 3920 Bales Ave., Kansas City, Mo.
Craigue, Alwyn W., 12 S. Wall St., Spokane, Wash.
Creel, Warren W., 90 State St., Albany, N.Y.
Curry, Elmer G., 1105 25th St., S.E., Cedar Rapids, Iowa

D

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Davis, Frederick H., 671 Broad St., Newark, N.J.
Day, Alfred D., 110 Los Robles Ave., Pasadena, Calif.
De Haven, Alice, 423 W. 5th St., Des Moines, Iowa
Delk, James H., 1825 "K" St., Sacramento, Calif.
Devereaux, Paul R., 58 Grand Blvd., Binghamton, N.Y.
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Dierke, Harold J., 475 Medical Arts Bldg., St. Paul, Minn.
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Dowlen, James C., 706 Cherry St., Chattanooga, Tenn.
Drew, Harold T., 305 Steiner Bldg., Lima, Ohio
Dubin, Allan M., 83 Fairfield Ave., Bridgeport, Conn.
Dubin, Lillian, 83 Fairfield Ave., Bridgeport, Conn.
Dunaway, Mrs. P. H., 515 Metropolitan Bldg., Muskogee, Okla.
Dunaway, Perry H., 515 Metropolitan Bldg., Muskogee, Okla.
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Dunn, Christopher, 500 43rd St., Union City, N.J.
Dunn, Helen M., 500 43rd St., Union City, N.J.
Dunphe, Dudley C., 670 Congress St., Portland, Maine
Durbin, Chris C., 204 N. Ervay St., Dallas, Texas

E

Eaton, Kenneth B., 409 Commercial Bldg., Dayton, Ohio
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Evans, Robert P., 110 Tremont St., Boston, Mass.

F

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Farnham, Hobart D., 1115 4th Ave., Seattle, Wash.
Faught, John C., Box 2572, Boise, Idaho
Faught, Wm. S. Sr., Box 2572; Boise, Idaho
Fessenden, James A., 3539 8th St., Riverside, Calif.
Fisher, Fannie S., 10 E. Town St., Columbus, Ohio
Fisher, Gail D., 10 E. Town St., Columbus, Ohio
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Foster, Marie M., 154 E. 4th St., Cincinnati, Ohio
Foster, Stanley K., 154 E. 4th St., Cincinnati, Ohio
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Freeman, Donald A., 632 Federal St., Camden, N.J.
Freeman, Jennie H., 1212 Temple Bldg., Rochester, N.Y.
Fuller, Orrin W., 16 N. 2nd St., Yakima, Wash.

G

Gale, Nathaniel, 206 S. Main St., Rockford, Ill.
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Gentling, Armand J., 109A 1st St., S.W., Rochester, Minn.
Gibbons, Ruth M., 709 Heartwell Bldg., Long Beach, Calif.
Gibbons, Wyatt E., 709 Heartwell Bldg., Long Beach, Calif.
Gibbs, Windsor M., 112 E. Peru St., Princeton, Ill.
Gilroy, Fred W., 207 Montgomery St., Ogdensburg, N.Y.
Glanz, Floyd O., 2624 Saturn, Huntington Park, Calif.
Glanz, Georgina M., 2624 Saturn, Huntington Park, Calif.
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Grossmann, Karl A., 603 Mott Bldg., Flint, Mich.
Grout, Paul D., 924 Des Moines Bldg., Des Moines, Iowa
Gurley, E. Danforth, 80½ Warren St., Concord, N.H.

H

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Hager, Ralph E., Harvey, N. Dak.
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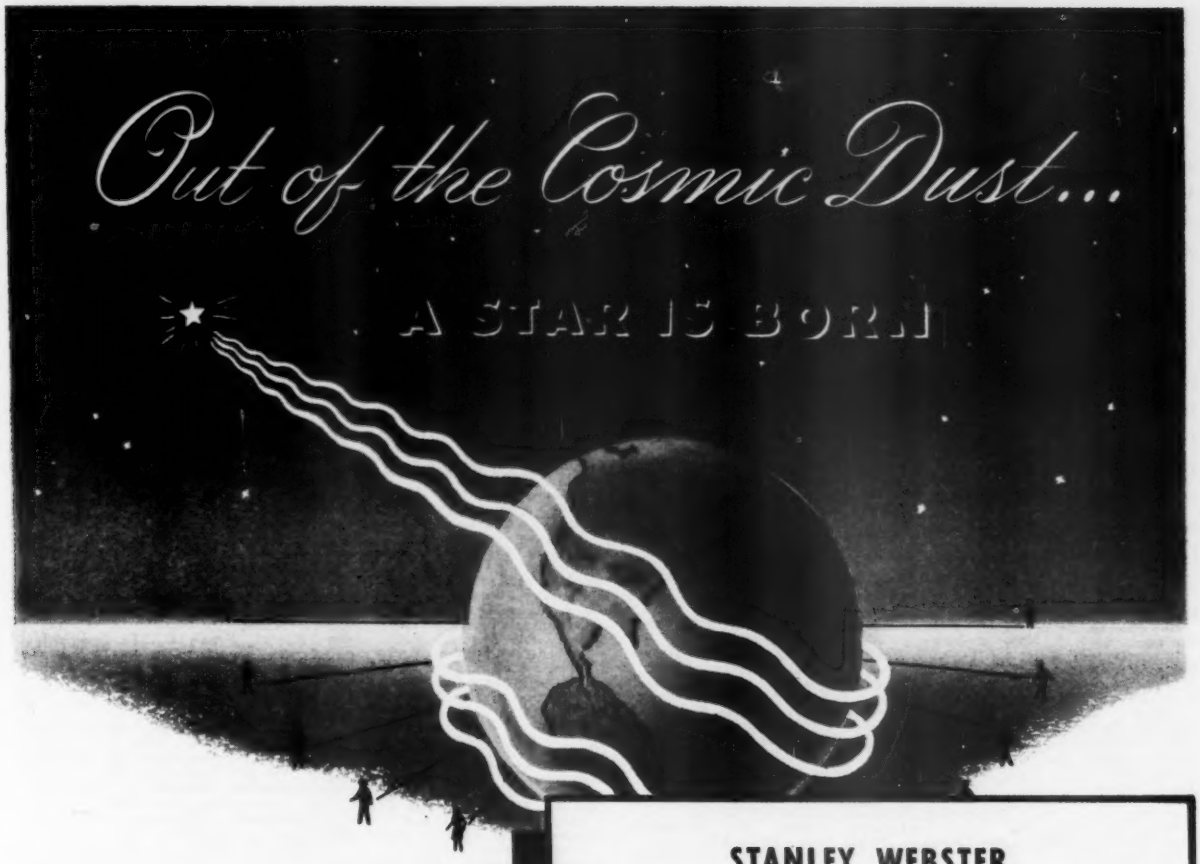
Hamilton, Gladys, 1102 Natl. City Bldg., Dallas, Texas
Hamilton, Henry Jr., 1102 Natl. City Bldg., Dallas, Texas
Hammond, John F., 78 Bull St., Charleston, S.C.



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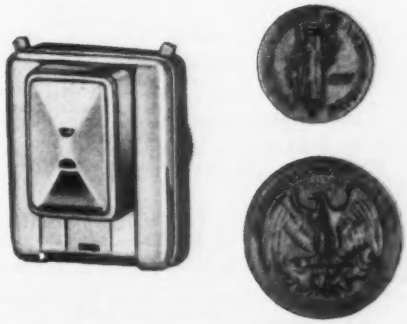

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Audiphone Company, 603 Mott Bldg., Flint, Mich.
Audiphone Company, 9 Ransom St., Grand Rapids, Mich.
Audiphone of Hartford, 721 Main St., Hartford, Conn.
Audiphone Co. of Miami, Inc., 1211 Security Bldg., Miami, Fla.
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B

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Better Hearing Institute of Milwaukee, 710 N. Plankinton Avenue, Milwaukee, Wis.
Better Hearing Service, 15 S., 1st Ave., Walla Walla, Wash.

C

Clark, C. M. Company, 801 Clark Bldg., Pittsburgh, Pa.
Cory Hearing Center, 7064 Plankinton Bldg., Milwaukee, Wis.

D

Day, Alfred, Hearing Center, 110 N. Los Robles Ave., Pasadena, Calif.
Delk Hearing Center, 1825 "K" St., Sacramento, Calif.

E

Evans Hearing Aid & Optical Co., 110 Tremont St., Boston, Mass.

F

Foster, S. K. & Associates, 154 E. 4th St., Cincinnati, Ohio

H

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Hearing Service, 1327 Sterick Bldg., Memphis, Tenn.
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Hollywood Hearing Center, 1720 Cahuenga Blvd., Hollywood, Calif.

L

Lamb's Hearing Center, 237 Pan American Bank Bldg., Miami, Fla.

M

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Maico Hearing Instruments, 8 S. Michigan Ave., Chicago, Ill.
Maico of Cleveland, Inc., 655 Rose Bldg., Cleveland, Ohio
Maico of Columbus, 327 E. State St., Columbus, Ohio
Maico Des Moines Hearing Service, 924 Des Moines Bldg., Des Moines, Iowa
Maico Detroit Company, 522 David Whitney Bldg., Detroit, Mich.
Maico Flint Co., 203 Paterson Bldg., Flint, Mich.
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N

Nevada Hearing Aid Beltone Service, P.O. Box 2292, Reno, Nev.

P

Pikes Peak Hearing Center, 15 E. Bijou St., Colorado Springs, Colo.

R

Rochester Hearing Aid Company, 109A 1st St., S.W., Rochester, Minn.
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I WILL SPEAK for the Deaf Child

Reprinted by permission of the author, Mr. Ray Graham . . . from a pamphlet issued by Vernon L. Nickell, Superintendent, Office of Public Instruction, Springfield, Illinois.

I will show you a child who is a regular child in every respect but for his lack of hearing. From lack of hearing may come lack of speech, lack of understanding and lack of performance. But he has all the organs of speech and hearing. He has a normal body, a normal brain and normal desires. He is normal in likes and dislikes, tastes and attitudes and appreciations and desires, joys and fears, feelings and ambitions.

HIS HOME . . .

I will show you his home where normally hearing brothers and sisters live and where parents see *another* child—not *this other child.* I will show you his home where exists love or neglect, want or plenty, discord or harmony, understanding or frustration, hope or despair. It is important that you see where he lives.

HIS COMMUNITY . . .

I will show you his community where there may be acceptance or rejection, opportunity or charity, failure or success. Whether this community is neighborhood or state it may represent open doors, open minds, open hearts—or they may be closed. Here may be recreational, educational, vocational opportunities—or the vacuum of hearing may be equaled by the vacuum of services for him. It is important that you know his vocation, his school, his playground, his church, his neighbor, his employer and his teacher.

HIS DOCTOR . . .

I will show you his doctor who helps him to keep what little hearing he may have. I will show you the clinic that helps to diagnose, analyze and plan for him. I will show you his hearing aid and the person who sold it to him, trained him to use it, and keeps it in repair. I will show you his audiometric chart and explain it to you. I will tell you about decibels, lip reading, speech development, language development, high frequencies, low frequencies, nerve deafness, bone-conduction, fenestration, and other things because understanding them is more essential than acquaintance with them.

HIS TEACHER . . .

I will show you his teacher, his psychologist and his social workers. These people will be his guides for many years. They can tell you that he needs to be accepted as a normal child first—and a child with an exceptionality second. They will explain his abilities, aptitudes, potentials, and drives. They will interpret his desire for status, for affection, for acceptance, for security and for opportunity. They will work with him to acquire language and speech, to get an education, to hold a job, to live in a hearing world.

YOU WILL SEE . . .

And after I have shown you these things, I trust you will see that:

1. The child who is deaf is first of all a child.
2. He may come from any home as a result of the accident of birth, or disease or injury.
3. Early discovery, diagnosis and treatment are essential.
4. This child born with all speech and hearing organs, and normal in his growth and development, needs to be allowed to develop normally. If he had hearing he would be learning speech and language by imitation in his early years. Therefore, these things must be started at a very early age in these natural years even though by different methods.
5. The democratic way of life guarantees him help that he may realize his personal, social, educational and vocational potentials.
6. Medical, social, education, legislative, vocational, home and community resources must work together for the realization of these objectives.

WHAT IS DONE FOR HIM IS IMPORTANT . . .

WHAT IS DONE WITH HIM IS MORE IMPORTANT . . .

WHAT IS DONE TO HIM IS MOST IMPORTANT!

Additional Members

. . . too late for listing

Beatty, Rowland J., 304 1st Natl. Bank Bldg., Peoria, Ill.

Bergae, Horace E., 311 Locust St., Elgin, Ill.

Dandois, Charles S., Jr., 519 Professional Bldg., Jacksonville, Fla.

Young, Edward J., 71 E. Monroe St., Chicago, Ill.

Beltone Hearing Service, Inc., 71 E. Monroe St., Chicago, Ill.

Applications Pending Board Action

Adams, Clint F., 2394 Carlsbad Dr., Sacramento, Calif.

Carter, Leroy B., 805 Statler Office Bldg., Boston, Mass.

Childers, Garland B., 1624 Franklin, Oakland, Calif.

Edmonton Hearing Aid Centre, 104 Clarke Bldg., Edmonton, Alberta, Canada

Fisher, James B., 311 Seymour St., Vancouver, B.C., Canada

Foster, Barton T., 104 Clarke Bldg., Edmonton, Alberta, Canada

Fredrickson, Donald W., 231 W. Wisconsin Ave., Milwaukee, Wis.

Genzer, Leo, 649 Linden Blvd., Brooklyn, New York.

Gossard, Leonard N., 116 Chester Ave., Bakersfield, Calif.

Green, David, 126 Post St., San Francisco, Calif.

Hammer, J. C., 312 McBurnett Bldg., San Angelo, Texas

Huffaker, Dautin W., 1575 E. 14th St., San Leandro, Calif.

Kelly, Louis J., 608 Commerce Bldg., St. Paul, Minn.

Lyon, William P., 957 E. Main St., Decatur, Ill.

Mroz, Josef, R. Barao de Itapetininga, 221, Sao Paulo, Brazil

Nadle, Orville J., 3447 S. Euclid Ave., Berwyn, Ill.

Ryan, Frank P., 1947 Delaware St., Sacramento, Calif.

Sayers, Beverly D., 317 Security Trust Bldg., Lynnfield, Mass.

Schuldt, Frank J., 2616 Orilla St., Santa Barbara, Calif.

Simpson, Jack, 930 Schofield Bldg., Cleveland, Ohio

Tischbein, Robert J., 154 E. 4th St., Cincinnati, Ohio

Wallenfels, Herman G., 34 Elmwood St., Burlington, Vt.

Jay L. Warren, Inc. Changes Leadership

After 12 years of service to the hard of hearing, Jay L. Warren, Chicago, has retired from the retail sales of hearing aids and has closed this department of his business. The office of Jay L. Warren, Inc., has been moved from their original location at 5 N. Wabash, Chicago, to 1247-49 W. Belmont Ave., Chicago 13, Ill., where they will continue the design and manufacture of Warren Gated Compression Auditory Training Units and School Hearing Equipment for hard of hearing students.

William E. Masterson, former manager of the hearing aid department of Jay L. Warren, Inc., has purchased their retail wearable hearing aid business on a partnership basis with Mr. W. G. Alles and will continue at 5 No. Wabash Ave., the fine service to the hard of hearing people of Chicago established by Mr. Warren more than 12 years ago.

Mr. W. G. Alles, although new to the hearing aid industry, brings an outstanding sales background gained through 15 years with Hallicrafters.

Hearing Aids Accepted by AMA Council

as of September 1, 1954

Transistor Hearing Aids

ACOUSTICON Models A-300, 310, 330, 335
AUDIVOX Model 71
BELTONE "Concerto" Model
MAICO Transist-Ear Model O
MICRONIC "All American"
MICROTONE Models T1, T1, T31, "Skylark"
OTARION Models C-15, D-1, F-22
PARAVOX Model KM
RADIOEAR Model 820
SONOTONE Models 1010, 1111
TELEX Models 954, 956
UNEX Model TR-3D
ZENITH Models Royal-T, Super Royal-T

Vacuum Tube Hearing Aids

ACOUSTICON Models A-17, A-180
AUDIOTONE Models 11, 15
AUDIVOX Models Super 67, 70
AUREX Models L, M
BELTONE Mono-Pac Models Lyric, Model M, Rhapsody
CLEARTONE Model 700
DAHLBERG Models D-2, D-3, D-4
FORTIPHONE Models 19LR, 20A, 210, 22
GEM Model V-60
GOLDENTONE Models 25, 69, 97
MAICO Maxitone, Model J, Top Secret Model L
MICRONIC Model Mercury
MICROTONE Models T-10, T-612
NORMATONE Models C, D-53
OTARION Models B-15, B-30, F-1, F-3, H-1, Custom 5
PARAVOX Model D, J
RADIOEAR Model 62 Starlet, 72, 82
SILVERTONE Models H-16, J-92, P-15
SOLO-PAK Model 99
SONOTONE Models 910, 920, 925, 940, 966, 977, 988
TELEVOX Model E
TELEX Models 99, 200, 400, 500, 952, 953, 1700
TONAMIC Model 50
TONEMASTER Cameo Model
UNEX Midget Models 95, 110, Models 200, 230
VACOLITE Models J, J-2
ZENITH Miniature 75, Royal, Super-Royal, Regent

(Accepted hearing aids more than 5 yrs. old have been omitted from this list for brevity.)

Semi-Portable Hearing Aids

AMBCO Hearing Amplifier
AUREX Hearing Aids
PRECISION Table Hearing Aid
SONOTONE Model 50 Professional Table Set

Incidence of Hearing Loss at 90 db Level

by Donald E. Mowrer

(Concluded from Page 13)

another factor to consider. The examiner noted that employees who worked near very loud noises (100 decibels and louder) had a more severe hearing loss than those who worked near less noisy machinery. It was also noted that employees who had worked around noisy machinery for a long period of time had more severe hearing losses than those employees who had only recently been around noisy machinery.

Summary

The purpose of this study was to determine the incidence of hearing loss among employees who worked around noisy machinery. Two hundred and twenty employees employed in five small industries were given discrete frequency threshold tests. Of the two hundred employees who worked near the noisy machinery, 72.5 per cent were found to have a hearing loss. Only 20 per cent of the remaining twenty employees (office personnel) were found to have a hearing loss. The average noise intensity in which the employees who worked around the noisy machinery was from 85 to 94 decibels.

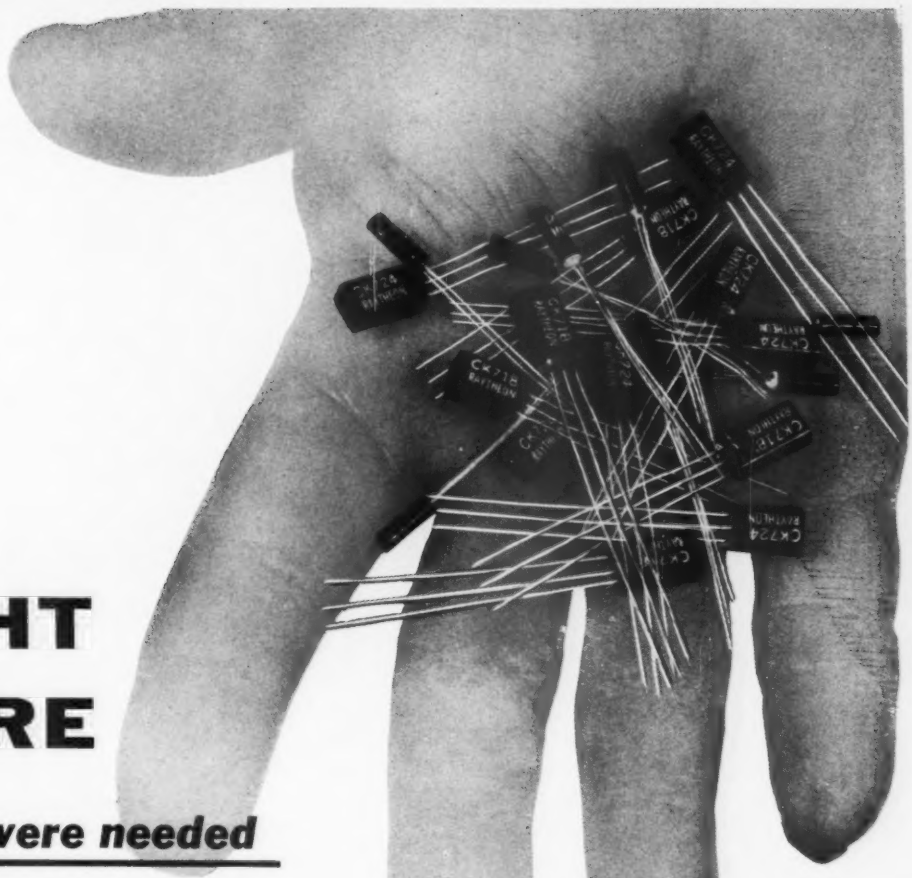
It is suggested that high noise intensities may be an important contributory factor in causing the hearing losses found, and that incidence of hearing loss may be a function of noise intensity. This study indicates that more investigative research is needed to determine the various causal factors of hearing losses which are found in industry.

References

1. UNITED STATES BUREAU OF EDUCATION, Care of the ears and prevention of deafness, *United States Public Health Reports*, 1940 55, 1501-1504.
2. UNIVERSITY OF MICHIGAN SCHOOL OF PUBLIC HEALTH. *Noise: Causes, Effects, Measurement, Costs, Control.* Lectures Sch. Publ. Hlth., Inst. Industr. Hlth., Ann Arbor, 1952, pp. 192.

***TABLE 2.* Sound-Survey Results in Decibel Levels.**

Industry	Highest Reading	Lowest Reading	Over-All Reading	Test Conditions
No. 1	105	80	90	52
No. 2	112	80	90	50
No. 3	108	83	90	65
No. 4	100	74	85	57
No. 5	100	90	94	62



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for our great and growing hearing aid industry

It wasn't a matter of accident or luck.

Raytheon had been the major source of hearing aid tubes for fifteen years, so naturally Raytheon was expected to supply *transistors* for hearing aids.

Raytheon already possessed the know-how, the production resources and quality control techniques that could only be built up over years of concentrated development.

The result is well known. Hearing aid makers and users just naturally associate *Raytheon* with *transistors.*

Hundreds of thousands of Raytheon Transistors are now in hearing aid use, putting on daily demonstrations of convenience, comfort, dependability and economy.

Is it any wonder, then, that every manufacturer of transistor hearing aids uses Raytheon Transistors.

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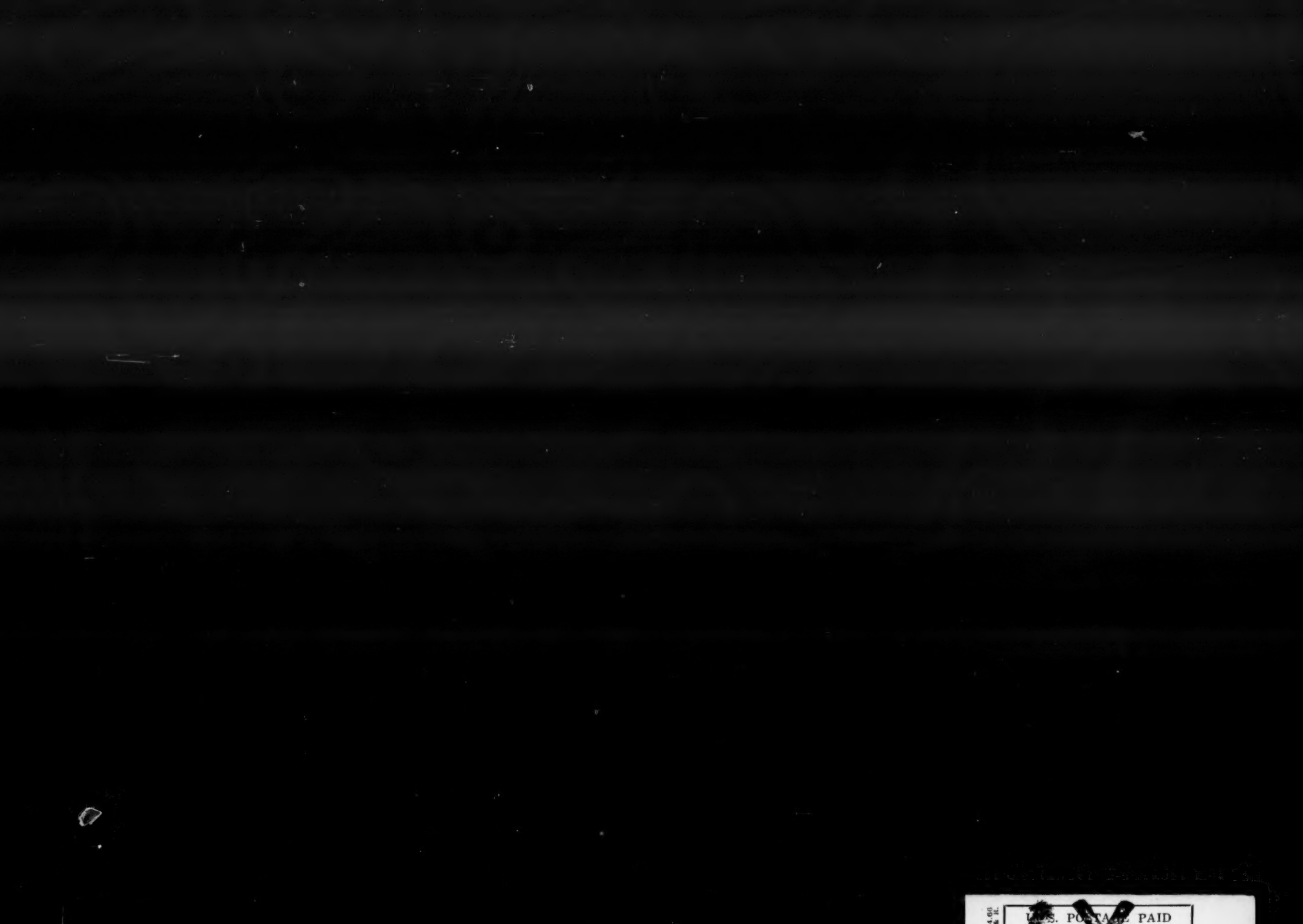
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